AMS Presentation
SHARP Symposium
May 17th, 2019

Nicholas Torney, Pharm.D.
Clinical Pharmacist, Infectious Diseases
Director, PGY2 ID Residency Program
May 17th, 2019

Objectives

1) Understand what antibiotic stewardship is and why it’s needed

2) Learn practical steps for antibiotic stewardship implementation in your work

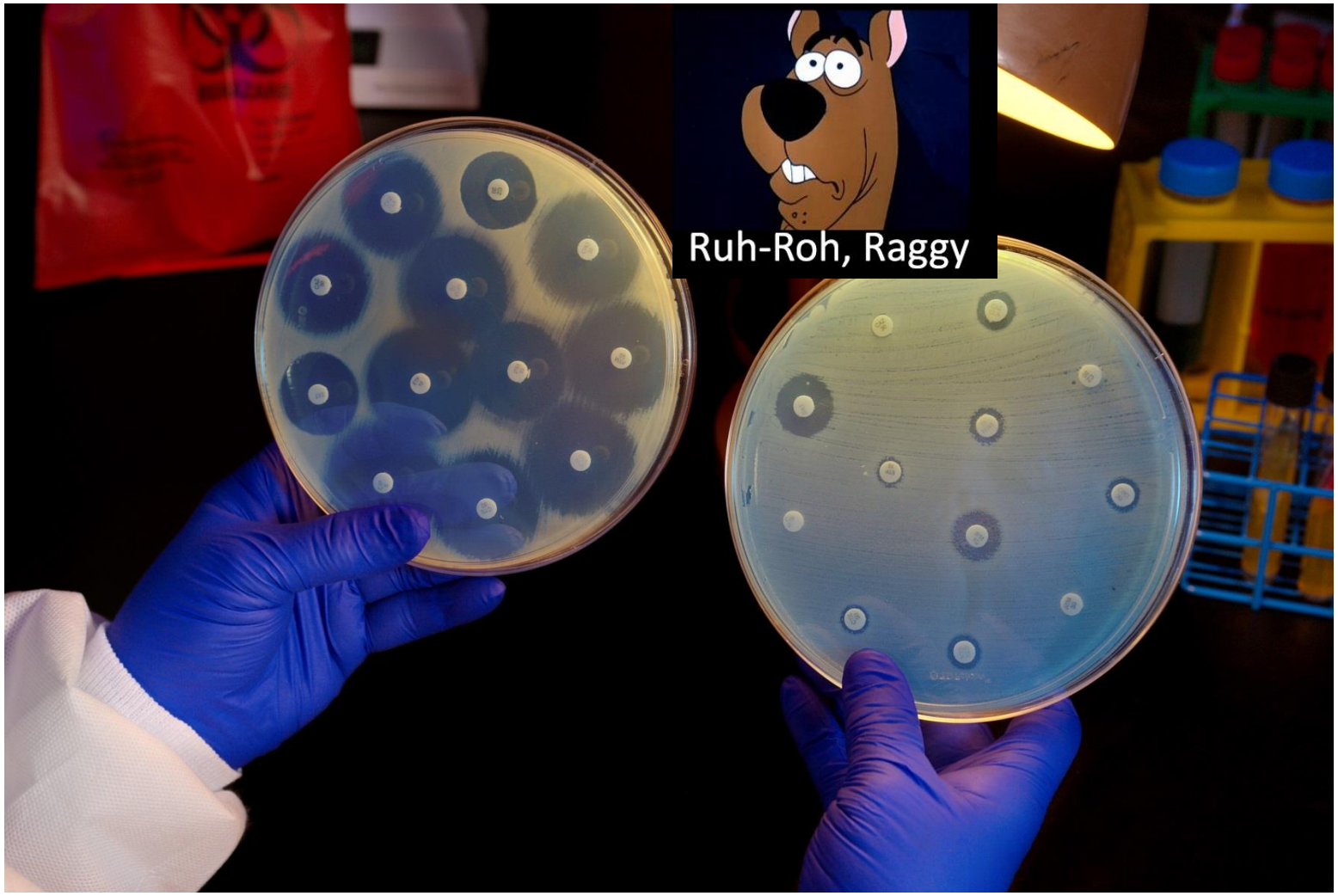
3) List resources available in antibiotic stewardship

What's the problem?

- 20–50% of all antibiotics prescribed in U.S. acute care hospitals are either unnecessary or inappropriate
- Up to **50%** of patients in the hospital are on antibiotics
- Unnecessary exposure leads to:
  - Adverse events (i.e. *Clostridioides difficile* infection, toxicity)
  - Antimicrobial resistance
  - Increased health care cost

Dellit TH, et al. *Clin Infec Dis* 2007;44:159-77

What's the Big Deal?



http://www.cdc.gov/media/dpk/2013/images/JDG_1203cc.jpg

Why We Need Stewardship

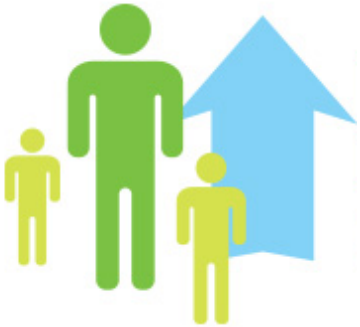
- What is antimicrobial stewardship?

Don’t think
“antibiotic police”

Do think
“antibiotic sommeliers”

Slide courtesy of Rachel MacLeod, PharmD (PGY2 ID Resident, MMC)

Antimicrobial Stewardship

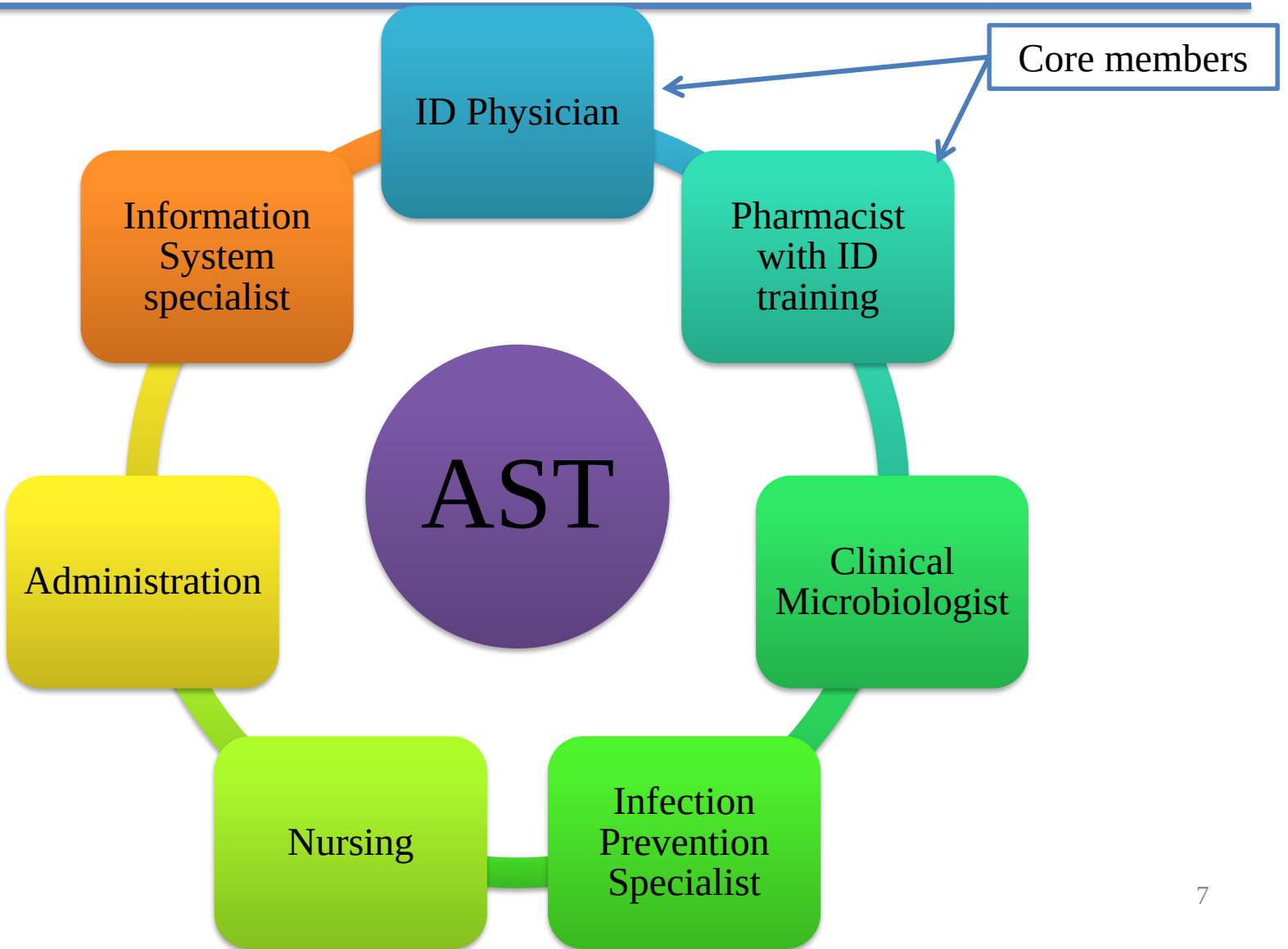


OPITIMIZE PATIENT OUTCOMES

REDUCE ANTIMICROBIAL RESISTANCE

DECREASE HEALTHCARE COSTS

Let's Meet the Team

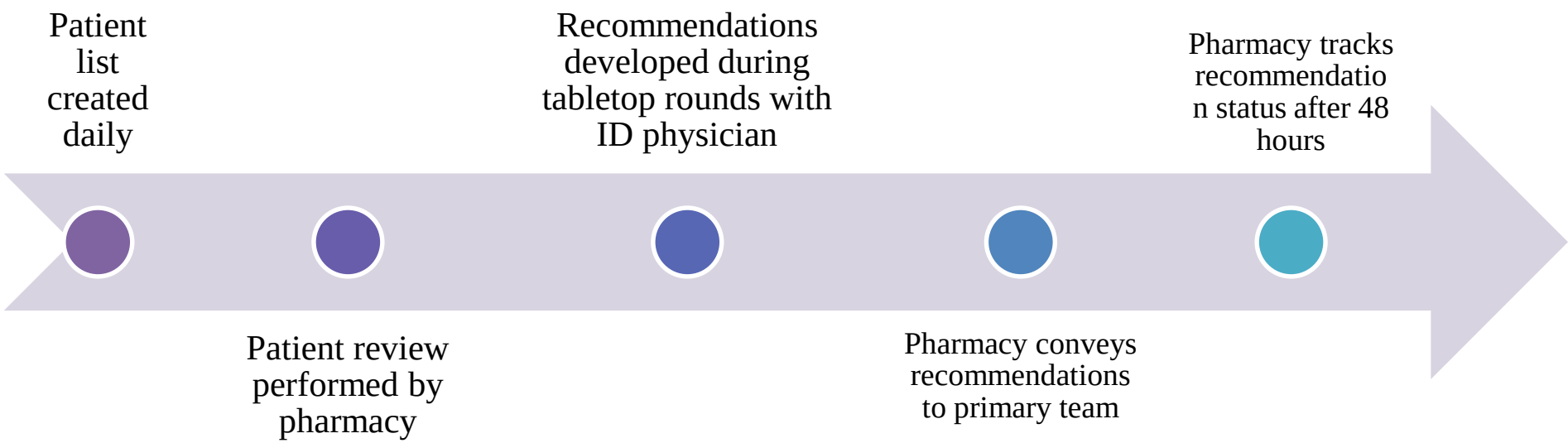


An Example of a Hospital ASP

Slide courtesy of Rachel MacLeod, PharmD (PGY2 ID Resident, MMC)

An Example of a Hospital ASP

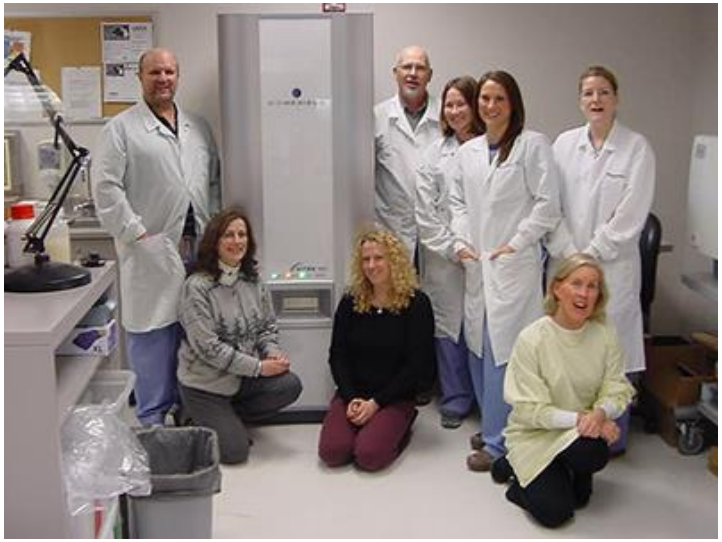
Daily ASP Activities



Slide courtesy of Rachel MacLeod, PharmD (PGY2 ID Resident, MMC)

An Example of a Hospital ASP

- Weekly “Micro Huddle”
- Monthly committee meetings
  - Infection Prevention & Antimicrobial Stewardship
  - Pharmacy & Therapeutics Committee
- Examples of other collaborative efforts
  - Creating antibiogram & institutional guideline
  - Implementing diagonistic stewardship initiatives
  - Issuing formal statements (ex. managing shortages, inappropriate practices)



2019-20 N. Michigan Antimicrobial Guidelines

ANTIMICROBIAL GUIDELINES – NORTHERN MICHIGAN 2019-2020

For Internal Use Only

Adult doses – Assuming normal renal function

Infection	Preferred	Alternatives
Streptococcal Pharyngitis (based on strep screen or culture)	Penicillin VK 500mg BID x 10 d	• Azithromycin (Zpak) or • Cephalexin 500mg BID x 10 d
Acute Sinusitis (Symptoms > 10 days)	• Abx not always required • Amox/clav 875 mg BID x 5 d	Doxycycline 100 mg BID x 5 d
Chronic Sinusitis	Value of antibiotics uncertain. Consider ENT/Allergy consult	
Acute otitis media (Abx not always required)	Amoxicillin 1 gm BID x 10 d	• Amox/clav 875 mg BID x 10 d • Azithromycin (Zpak)
Acute Bronchitis (Usually viral)	No antibiotics - Consider testing for Pertussis, Chlamydia, and Mycoplasma	
Acute exacerbation chronic bronchitis (Abx not always required)	Azithromycin (Zpak)	• Doxycycline 100mg BID x 5 d or • Amox/clav 875 mg BID x 5 d
Community-Acquired Pneumonia (CAP) OP - Uncomplicated	• Azithromycin 500mg daily x 5 d or • Doxycycline 100mg BID x 5 d	Procalcitonin WNL may assist in stopping antibiotics early before planned end date in all pneumonia
CAP (OP) – Comorbidities	Levofloxacin 750mg daily x 5 d	Amoxicillin 1 gm TID + (Azithromycin or Doxycycline) x 5 d
CAP (IP) – Non-ICU & ICU CAP can be treated for 5 days if: Afebrile x 48 hr with no more than one of the following: ☐ Temperature ≥ 37.8 ºC ☐ Heart rate ≥ 100 bpm ☐ Resp. rate ≥ 24 breaths/min ☐ Systolic BP ≤ 90 mmHg ☐ Arterial O_2 sat ≤ 90% or pO_2 ≤ 60 mmHg on room air	Ceftriaxone 1 gm daily + Azithromycin 500mg daily x 5 d* *Consider 7 d duration if 2 or more signs of clinical instability are present at day 5. **Max azithromycin duration = 5 d	Levofloxacin 750 mg daily x 5 d* *Consider 7 d duration if 2 or more signs of clinical instability are present at day 5.
Hospital-acquired Pneumonia (HAP) & Ventilator associated Pneumonia (VAP) • MRSA nasal swabs have high negative predictive value when assessing if MRSA is the primary pathogen in respiratory infections	Cefepime 2 gm Q8hr x 7 d Add MRSA Coverage (Vancomycin* or Linezolid** 600mg Q12hr x 7 d) if any present: • IV antibiotics within 90 days • Septic shock • Need for ventilator support due to pneumonia	Pip/Tazo 3375 mg IV Q8h 4hr INF x7d MRSA coverage criteria (left): Add Vancomycin* or Linezolid** 600mg Q12hr x 7 d
Aspiration Pneumonia	Witnessed event does not require antibiotics. Consider monitoring for 48hr prior to starting antibiotics.	• Ampicillin/Sulbactam 3 gm Q6h x7d • Ceftriaxone 1 gm daily x7 d • Clindamycin 900mg IV Q8hr x7d
Asymptomatic Bacteriuria	**No antibiotics,** unless pregnant or urologic procedure with mucosal bleeding **Urine culture not indicated in the absence of urinary symptoms**	
Cystitis – Uncomplicated (non-pregnant females)	• Nitrofurantoin monohydrate / macrocrystals 100mg BID x 5 d or • TMP-SMX DS BID x 3 days or • Fosfomycin 3 gm x 1 dose	Cephalexin 500mg BID x 7 d NOTE: Fluoroquinolones are not recommended empirically for uncomplicated cystitis

Infection	Preferred	Alternatives
Cystitis – Complicated, without sepsis or bacteremia • Duration: 7 days usually appropriate. 10-14 days if delayed response	• Ceftriaxone 1 gm Q24hr x 7d • Nitrofurantoin 100 mg BID* x 7d • Fosfomycin 3gm Q48hr x 3 doses* *avoid if pyelonephritis suspected	• Pip/tazo 3375 mg Q8hr (history of resistant GNR bacteria)
Pyelonephritis – uncomplicated	Ceftriaxone 1 gm QD, with step-down to TMP-SMX (if susceptible) x 14 d	• TMP-SMX DS BID x 7-14 d • Ciprofloxacin 500 mg BID x 7 d • Levofloxacin 750 mg QD x 5 d
Diverticulitis– uncomplicated (Abx should be used selectively rather than routinely)	Cephalexin 500mg QID + Metronidazole 500mg TID (Typical duration 7 – 10 days)	Levofloxacin 500 mg QD + Metronidazole 500mg TID (Typical duration 7 – 10 days)
Peritonitis, intra-abd abscess, pelvic abscess, diverticulitis (IP) • Duration: 5 days after adequate source control i.e. OR drainage. • If no/inadequate source control, duration depends on response.	• Ceftriaxone 2 gm IV Q24hr + Metronidazole 500mg Q8hr • Piperacillin/Tazobactam 3.375gm IV Q8H 4hr INF	Levofloxacin 750 mg Q24hr + metronidazole 500mg Q8hr
Clostridioides difficile colitis Initial episode	Vancomycin 125 mg PO QID x 10 d	Fidaxomicin 200 mg PO BID x 10 d
Clostridioides difficile colitis Fulminant (hypotension or shock, ileus, megacolon)	Vancomycin 500mg PO QID + Metronidazole 500 mg IVPB Q8H until gut is functioning	ID and/or GI Consult
Clostridioides difficile colitis Recurrence	1st recurrence: Vancomycin pulse/taper, OR Fidaxomicin 200 mg BID x 10 d if vancomycin was used for initial episode 2nd or subsequent recurrence: ID and/or GI consult	
Purulent Cutaneous Abscess – (mild-moderate) I&D, culture	• TMP-SMX DS BID x 7 d or • Doxycycline 100mg PO BID x 7 d	Linezolid** 600 mg PO BID x 7 d
Cellulitis – Non-purulent (mild – moderate) • Symmetrical, bilateral erythema more likely stasis dermatitis than cellulitis	• Pen VK 500 mg QID x 5-7 d or • Cephalexin 500mg QID x 5-7 d	Doxycycline 100mg BID x 5-7 d
Diabetic Foot Ulcer (OP) • Duration: 1 to 3 weeks depending on severity	Amox/clav 875 mg BID + (TMP-SMX DS BID or Doxycycline 100mg BID if MRSA suspected)	TMP-SMX DS BID +/- Metronidazole 500 mg TID
Diabetic Foot Ulcer (IP) • If stable, consider holding Abx prior to deep bone specimen	• Ampicillin/sulbactam 3gm IV Q6hr • Add vancomycin* if MRSA suspected *Duration depends on clinical findings	Ceftriaxone 2gm QD + Metronidazole 500mg Q8hr (Add Vancomycin* if MRSA suspected)
Animal, Human Bite (If deep structure involved, I&D and use IV)	• Amox/Clav 875mg BID x 7 d (OP) • Ampicillin/sulbactam 3gm IVPB Q6H x 7 d if soft tissue only (IP)	Clindamycin + (TMP-SMX DS or Doxycycline) x 7 d
Septic Arthritis (Surgical debridement mandatory)	Vancomycin* + Ceftriaxone 2gm Q24H	Vancomycin* + Ciprofloxacin if not at risk for STD

***Pharmacy to dose **ID consult required at MMC**

In complicated cases consider consultation with your infectious disease physician and pharmacist.

After 48 hours of antimicrobial therapy, reassess for appropriateness and opportunities for de-escalation

2019-20 Antibiogram

2019 – 2020 Northern Michigan Antibiogram: Common Organisms – Percent Susceptible

Antibiogram data from 2018	# of isolates	Penicillin	Ampicillin	Unasyn/aug	Nafcillin/oxa	Pip/tazo	Cefazolin	Cefuroxime	Ceftriaxone	Ceftazidime	Cefepime	Ciprofloxacin	Levofloxacin	Moxifloxacin	Gentamicin	TMP/SMX	Meropenem	Azithromycin	Doxycycline	Clindamycin	Vancomycin (IV only)	Nitrofurantoin (urine only)
S. pneumoniae	230	68	+	+	+	+	+	+/-	87	+/-	+	NR	99	+	-	84	+	+	91	+/-	100	-
S. aureus, MSSA	2,855	0	-	100	100	100	100	+	+	+/-	100	NR	NR	NR	-	98	+	+/-	98	78	100	99
S. aureus, MRSA	1,232	-	-	-	-	-	-	-	-	-	-	NR	NR	NR	-	95	-	-	94	67	100	85
Staphylococcus epidermidis	924	0	0	+/-	43	+/-	44	+/-	+/-	-	+/-	NR	NR	NR	+/-	59	+/-	+/-	89	63	100	99
Streptococcus, Group B	721	100	100	100	100	100	100	+	100	+/-	100	NR	97	+	-	99	+	+/-	+/-	48	100	-
Streptococcus intermedius	91	98	98	98	+/-	98	+	+	99	+/-	100	NR	99	+	-	+/-	+	-	+/-	70	100	-
Enterococcus faecalis	1,688	99	99	99	-	+	-	-	-	-	-	NR	NR	+/-	+	-	+	-	+/-	-	99	99
Enterococcus faecium	113	40	40	40	-	-	-	-	-	-	-	NR	NR	-	+	-	-	-	-	-	68	25
Haemophilus influenzae	264	-	74	99	-	+	-	+	β9	+	+	+	100	+	+	62	+	97	100	-	-	-
Escherichia coli	12,701	-	60	67	-	98	93	+	96	96	96	85	85	+	93	82	100	-	+	-	-	97
Proteus mirabilis	1,063	-	73	83	-	99	92	+	96	96	96	67	71	+	88	73	99	-	-	-	-	-
Klebsiella oxytoca	452	-	-	62	-	94	73	+	98	99	99	99	99	+	99	97	100	-	+/-	-	-	87
Klebsiella pneumoniae	2,022	-	-	89	-	97	96	+	97	97	97	97	98	+	98	93	99	-	+/-	-	-	39
Enterobacter cloacae	542	-	-	-	-	92	-	+/-	85	86	98	97	97	+	99	92	98	-	-	-	-	41
Klebsiella aerogenes	258	-	-	-	-	83	-	+	85	85	100	99	99	+	99	98	100	-	-	-	-	8
Serratia marcescens	227	-	-	-	-	95	-	-	99	100	100	96	96	+	99	99	100	-	-	-	-	-
Pseudomonas aeruginosa	1,299	-	-	-	-	93	-	-	-	93	94	85	81	+	95	-	96	-	-	-	-	-

Interpretive Criteria:

Numerical data represents local susceptibility data. Other (+/-) represents national data.

(+) Usually effective or >60% susceptible nationally

(+/-) May be effective 30–60% susceptible

(-) Usually not effective or <30% susceptible

(NR) Not Recommended due to development of resistance when given *in vivo*

Thanks to the Munson and McLaren Northern MI labs for compiling the antibiogram data

S. aureus, % MRSA = 30%

Stewardship Implementation Resources

- Your Local ID experts
- CDC Core Elements
  1. Acute Care
  2. Long Term Care
  3. Outpatient
  4. Critical access
- TJC Antimicrobial Stewardship Standard
- NQF Playbook

CDC Core Elements of Hospital Antimicrobial Stewardship Programs

1. Leadership commitment
2. Accountability
3. Drug expertise
4. Action
5. Tracking
6. Reporting
7. Education

1 Leadership Commitment

- Letter of support from Administration
- Support for the following:
  - Training/education
  - Multidisciplinary “buy-in”
  - Full Time Equivalent(s) (FTE) dedicated to ASP
- ASP Policy

2

Accountability

- The leader of the ASP is responsible for program outcomes.
- Typically, this is an ID physician with a pharmacist as co-leader.
- Formalized ID/ASP training encouraged
- May or may not be full time job

3

Drug Expertise

- Pharmacy co-leader
- Formal ID/ASP training encouraged
  - ID PGY2
  - ID Fellowship
- Other training avenues/strategies for non-ID trained pharmacists
  - Making a Difference in Infectious Diseases (MAD-ID)
  - Society of Infectious Diseases Pharmacists (SIDP) training program
  - Society of Healthcare Epidemiology of America (SHEA) training program

4

Action

- Implement at least one recommended action/strategy
- Many different strategies exist
- Important to not implement too many strategies at once

4

Action: Examples

1. Guideline implementation
2. IV to PO conversion
3. Pharmacist automatic renal dosing
4. Diagnostic stewardship
   - Urine Cultures
   - *C. diff* testing
5. Antibiotic allergy stewardship
   - Penicillin allergy assessment & skin testing
6. Positive Blood culture reporting coupled with rapid multiplex PCR
7. 48-72 hour time out on all antimicrobials
8. Prospective audit of targeted antimicrobials
9. Antimicrobial restriction policy (criteria must be met prior to dispensing select antimicrobials)

4

Action: Implementation

- The Ideal Implementation:
  - Consistent (daily or M-F)
  - Real Time, not retrospective
  - Method of communication is effective and efficient
    - Protocol-driven vs. EMR alert vs. page vs. face-to-face

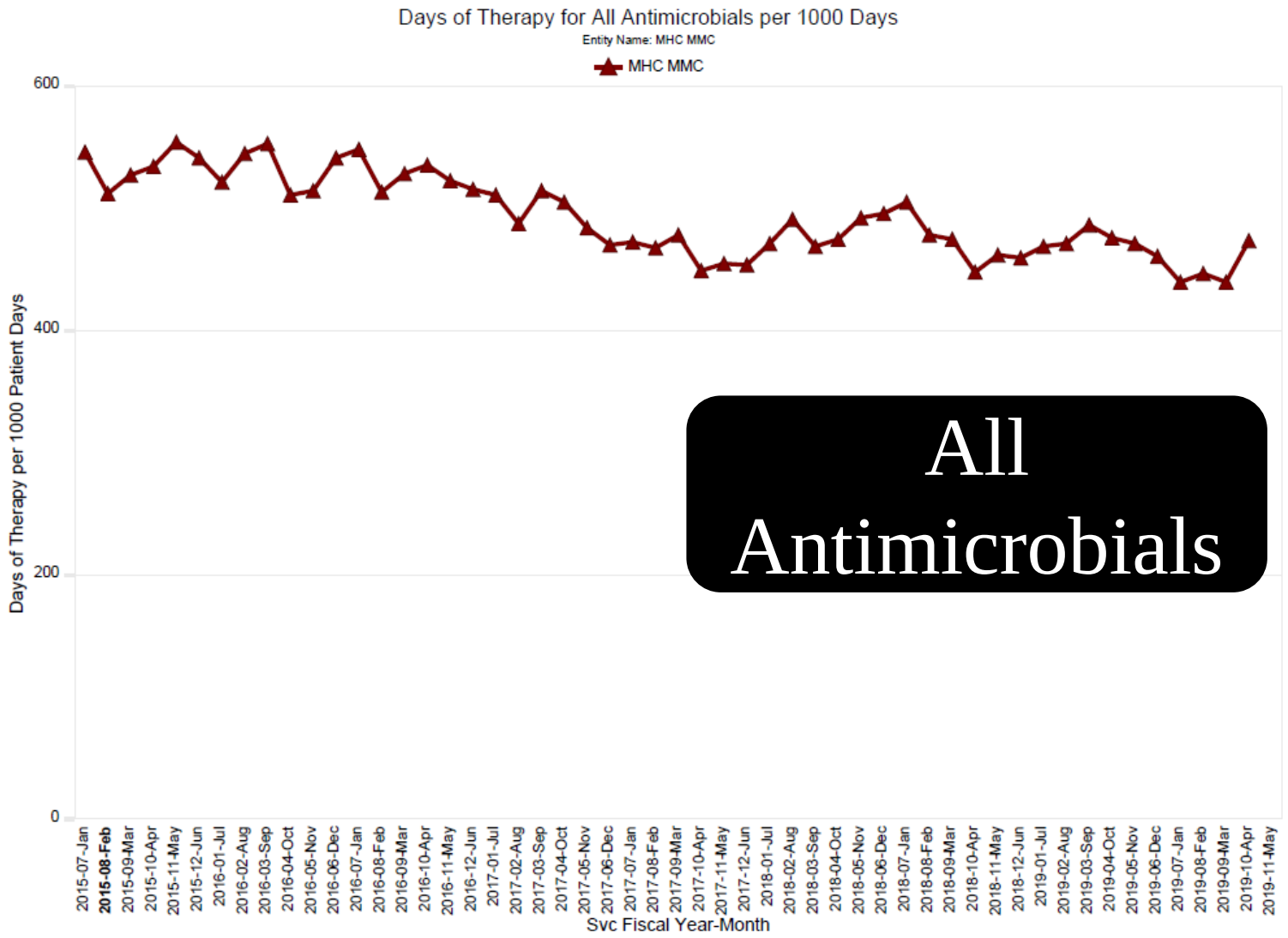
5

Tracking

- Monitor antibiotic prescribing and resistance patterns
- Assess various measures
  - Outcome measures
  - Measures related to unintended consequences
  - Process measures
  - Antibiotic use measures

5

DOT / 1000 pt. days



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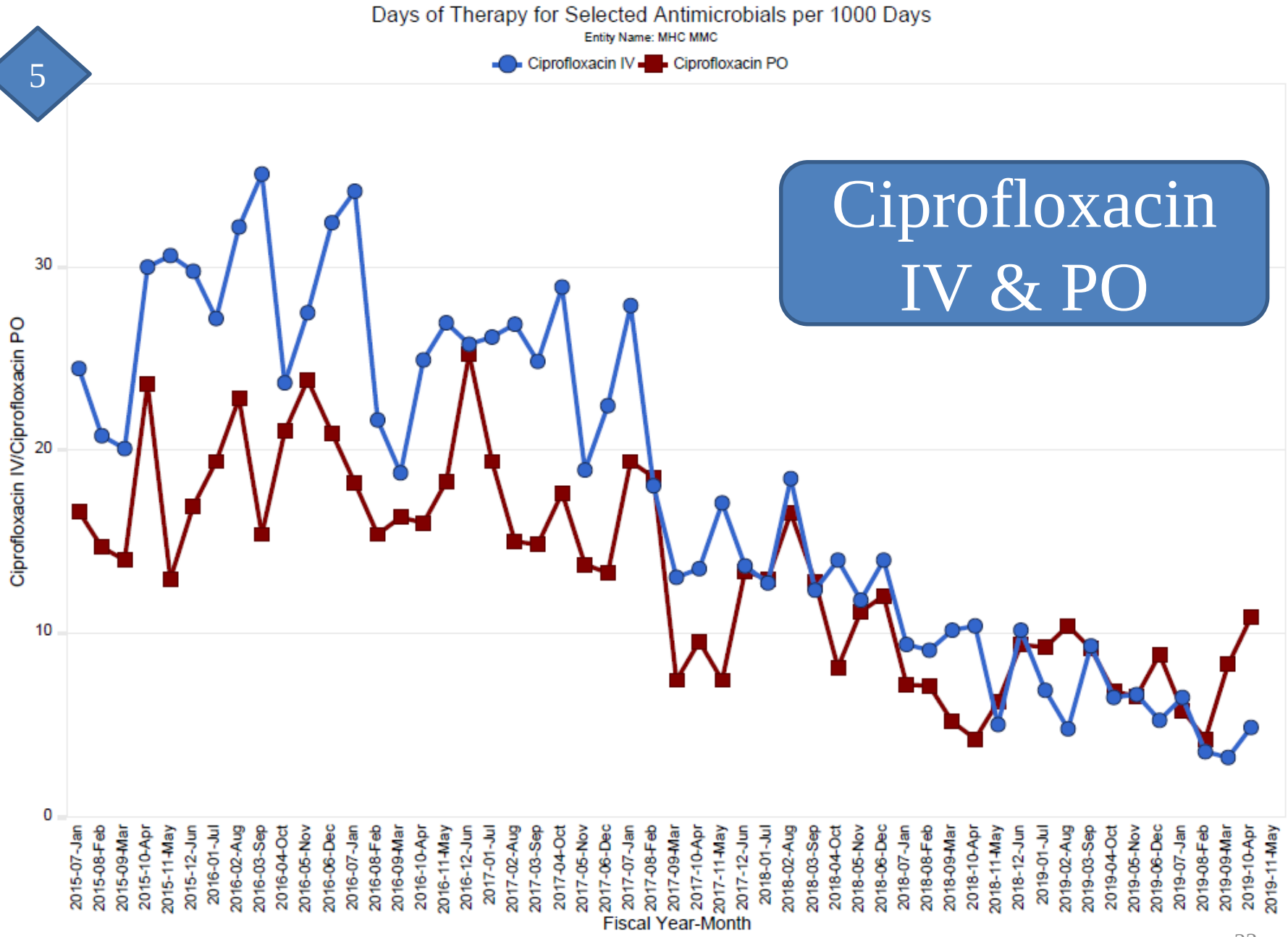

Ciprofloxacin IV & PO

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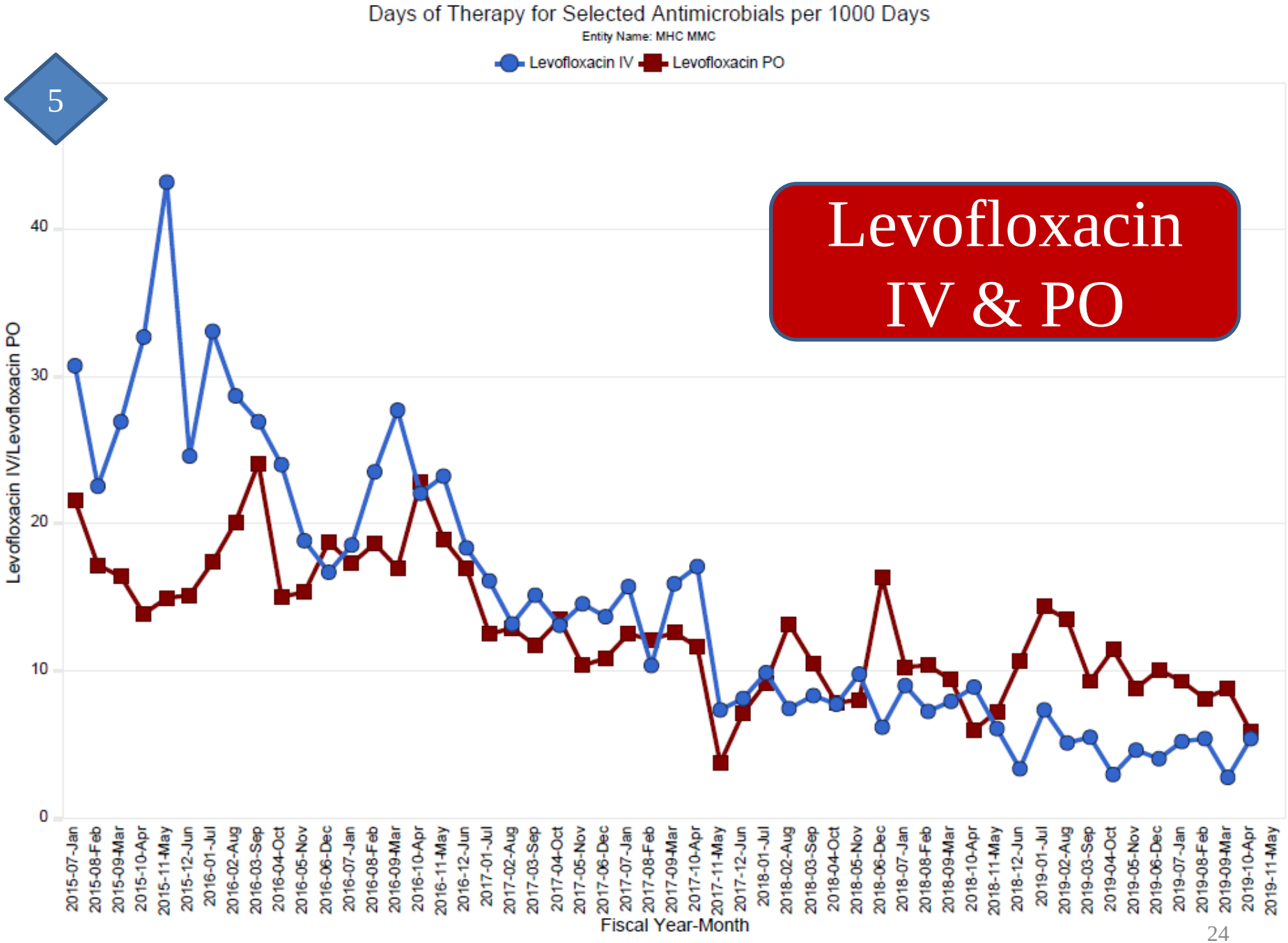
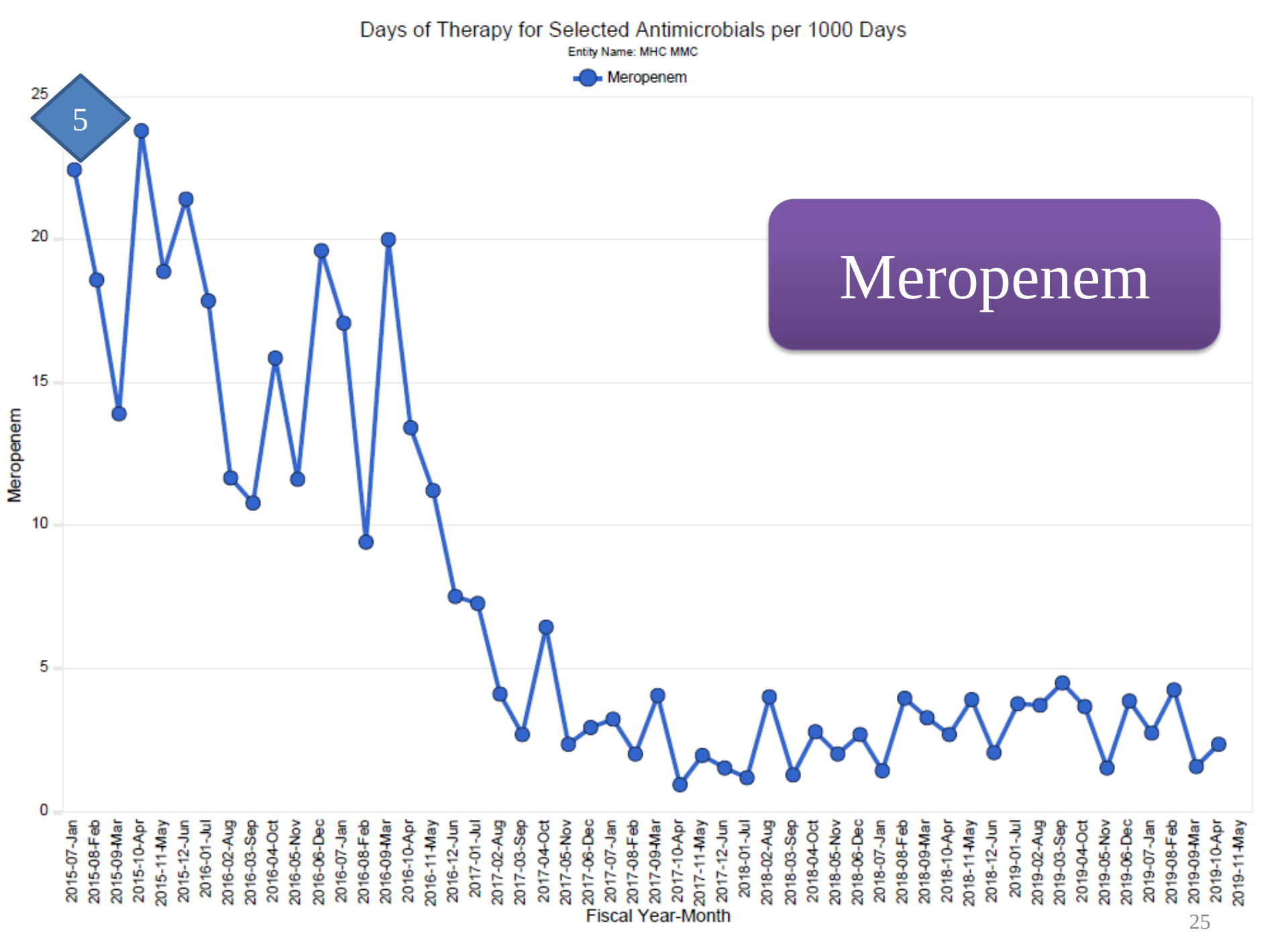


Levofloxacin IV & PO


Days of Therapy for Selected Antimicrobials per 1000 Days
Entity Name: MHC MMC
Meropenem
5
Meropenem
Meropenem
Fiscal Year-Month
0
5
10
15
20
25
2015-07-Jan
2015-08-Feb
2015-09-Mar
2015-10-Apr
2015-11-May
2015-12-Jun
2016-01-Jul
2016-02-Aug
2016-03-Sep
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2018-10-Apr
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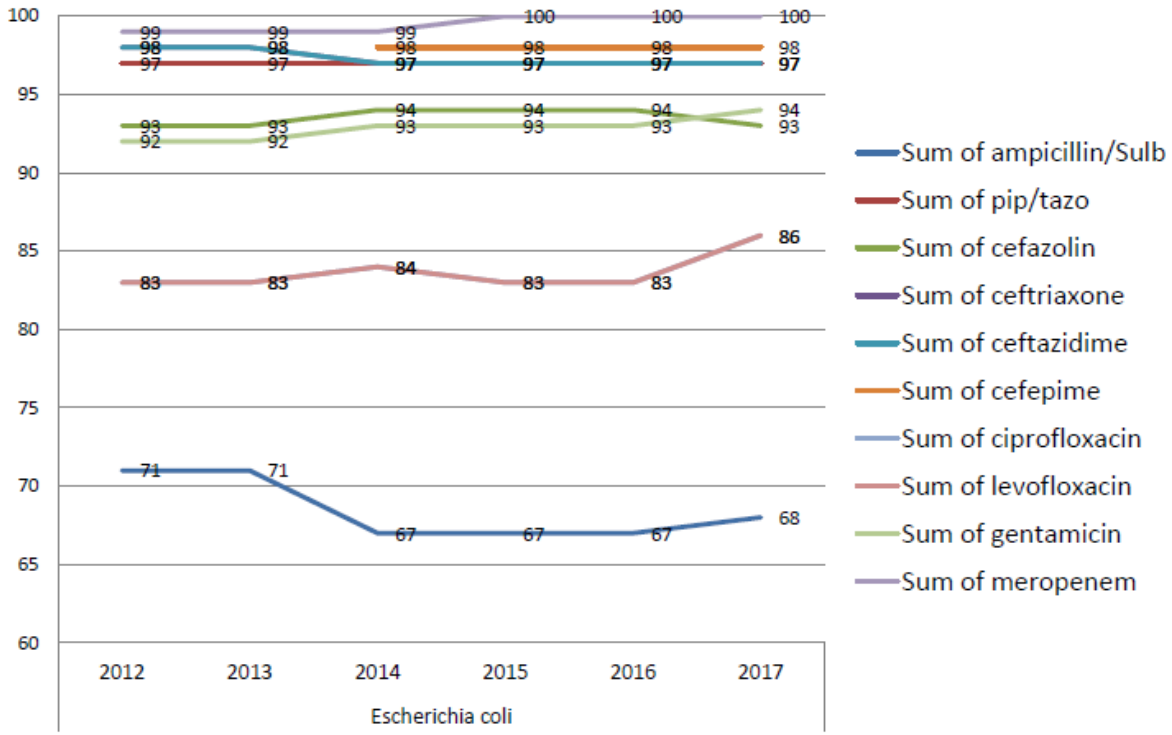
2019-02-Aug
2019-03-Sep
2019-04-Oct
2019-05-Nov
2019-06-Dec
2019-07-Jan
2019-08-Feb
2019-09-Mar
2019-10-Apr
2019-11-May

5

Resistance Rates

% Susceptibility of *E. coli* and Gram negative agents 2012 – 2017

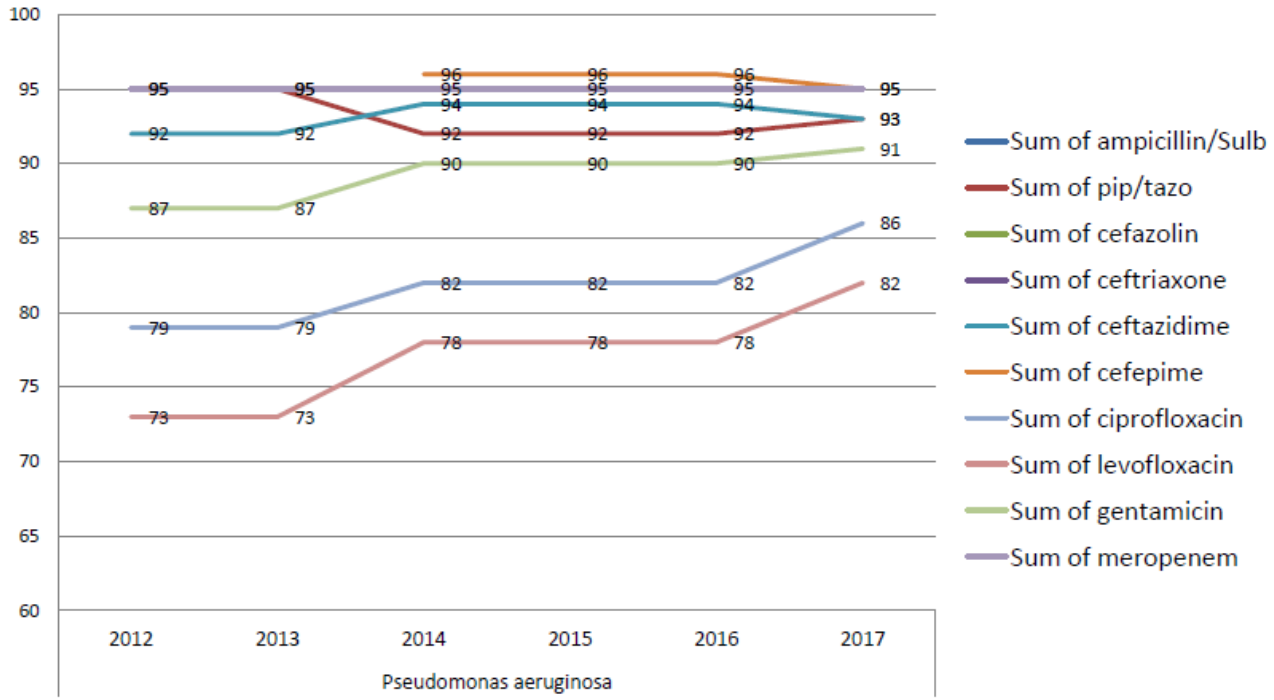


Data from: MMC, Cadillac, Grayling, and McLaren Northern Michigan

5

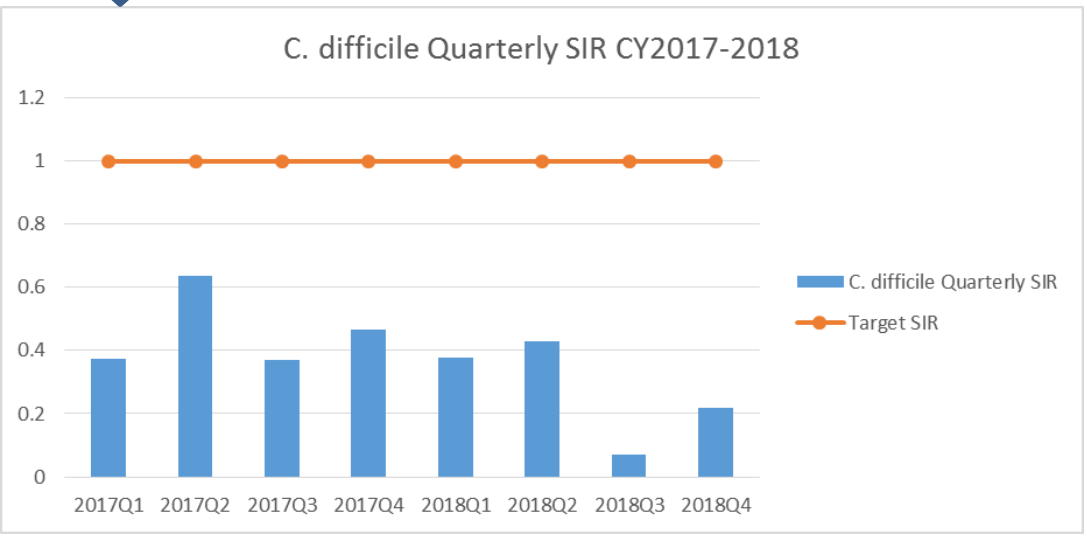
Resistance Rates

% Susceptibility of *P. aeruginosa* and Gram negative agents 2012 – 2017

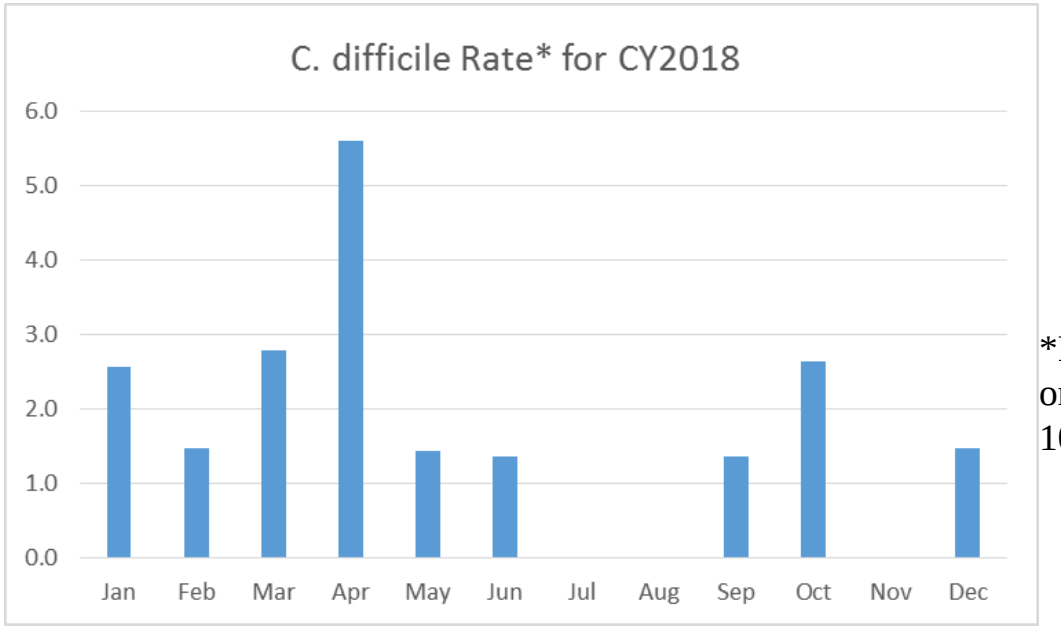


Data from: MMC, Cadillac, Grayling, and McLaren Northern Michigan

C. difficile Infections

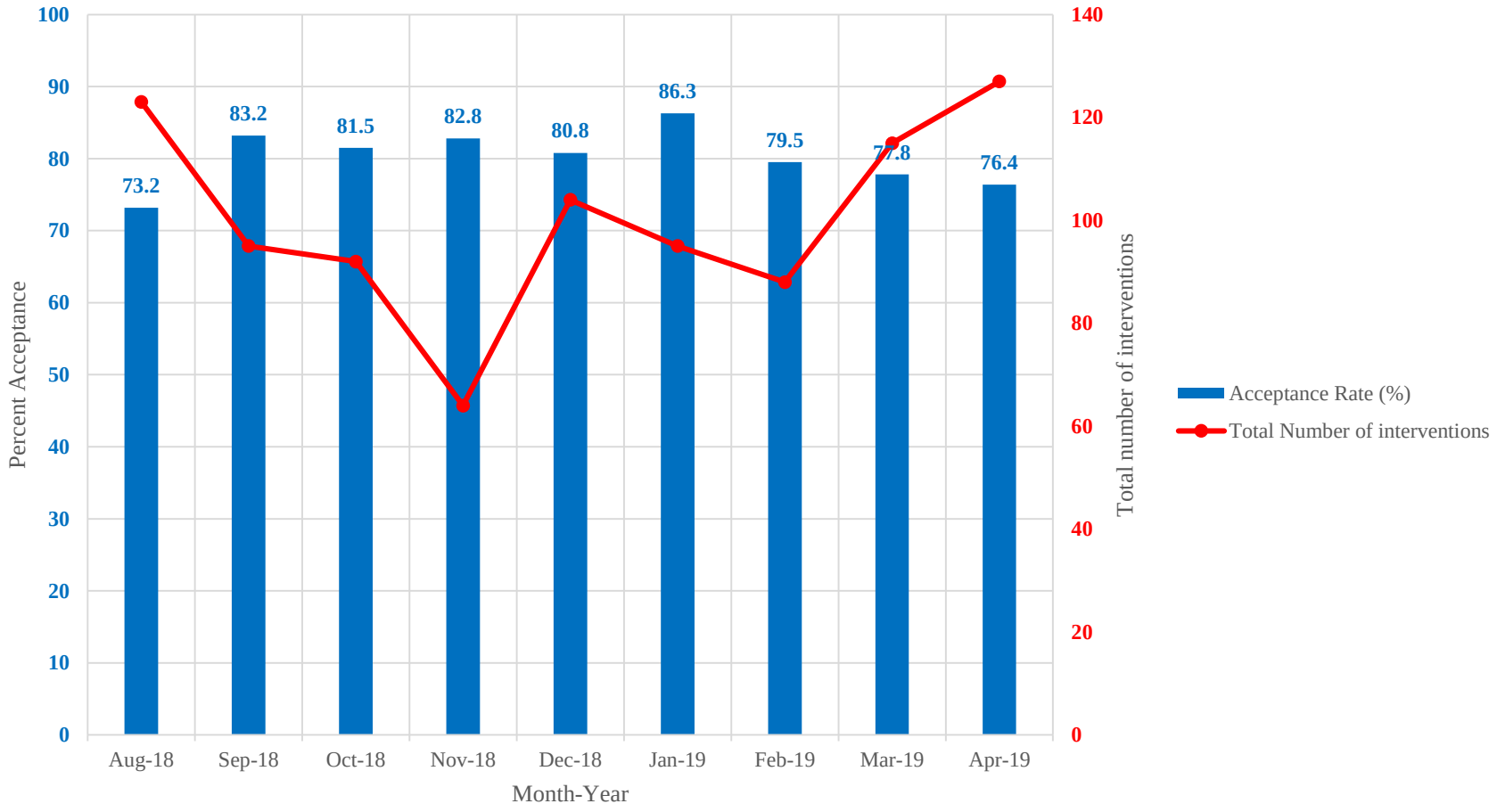


MMC Hospital Onset CDI Data reported to NHSN



*Rate = Hospital onset C. difficile per 10,000 Patient Days

5 Acceptance Rates of Interventions



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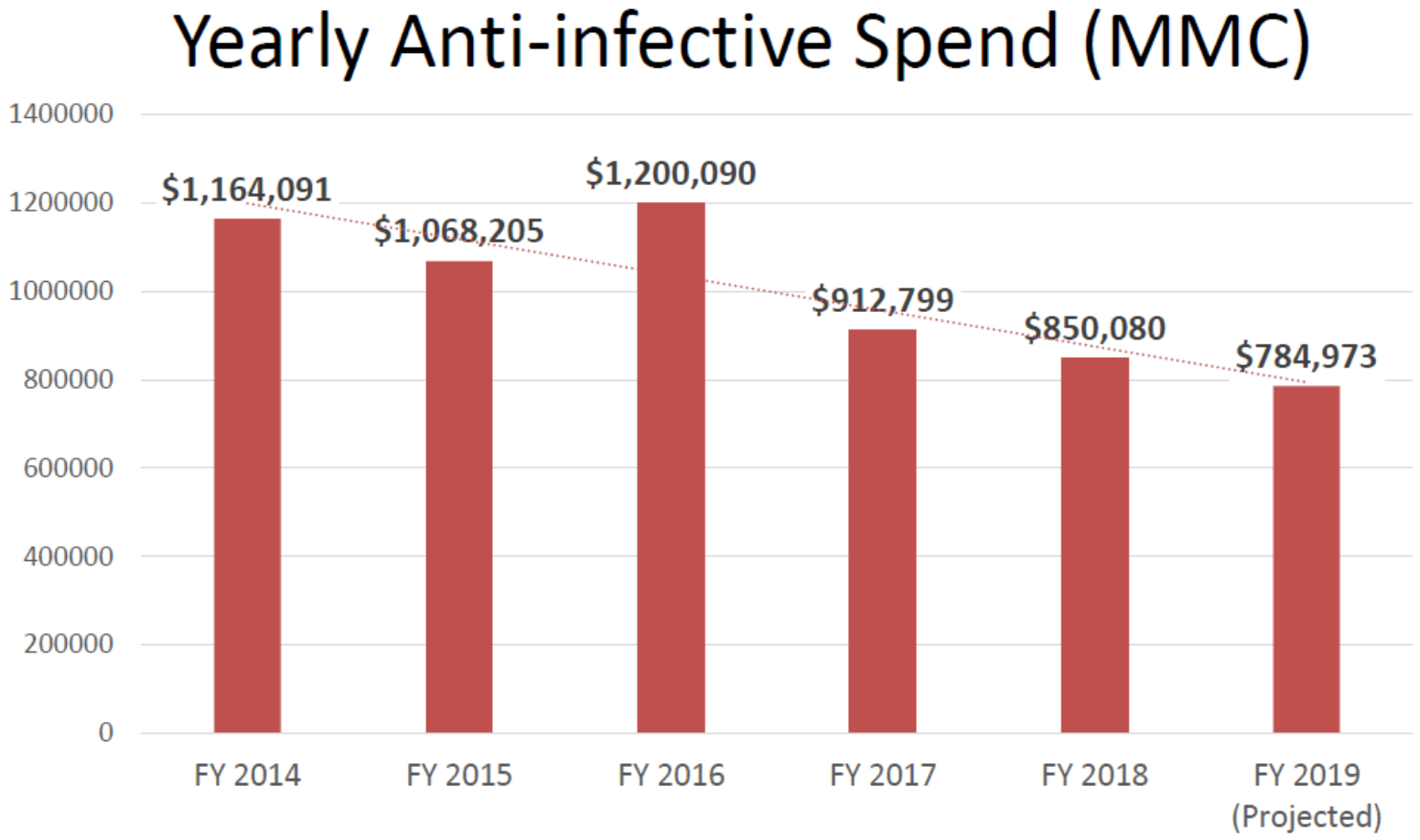
Cost of Anti-infectives



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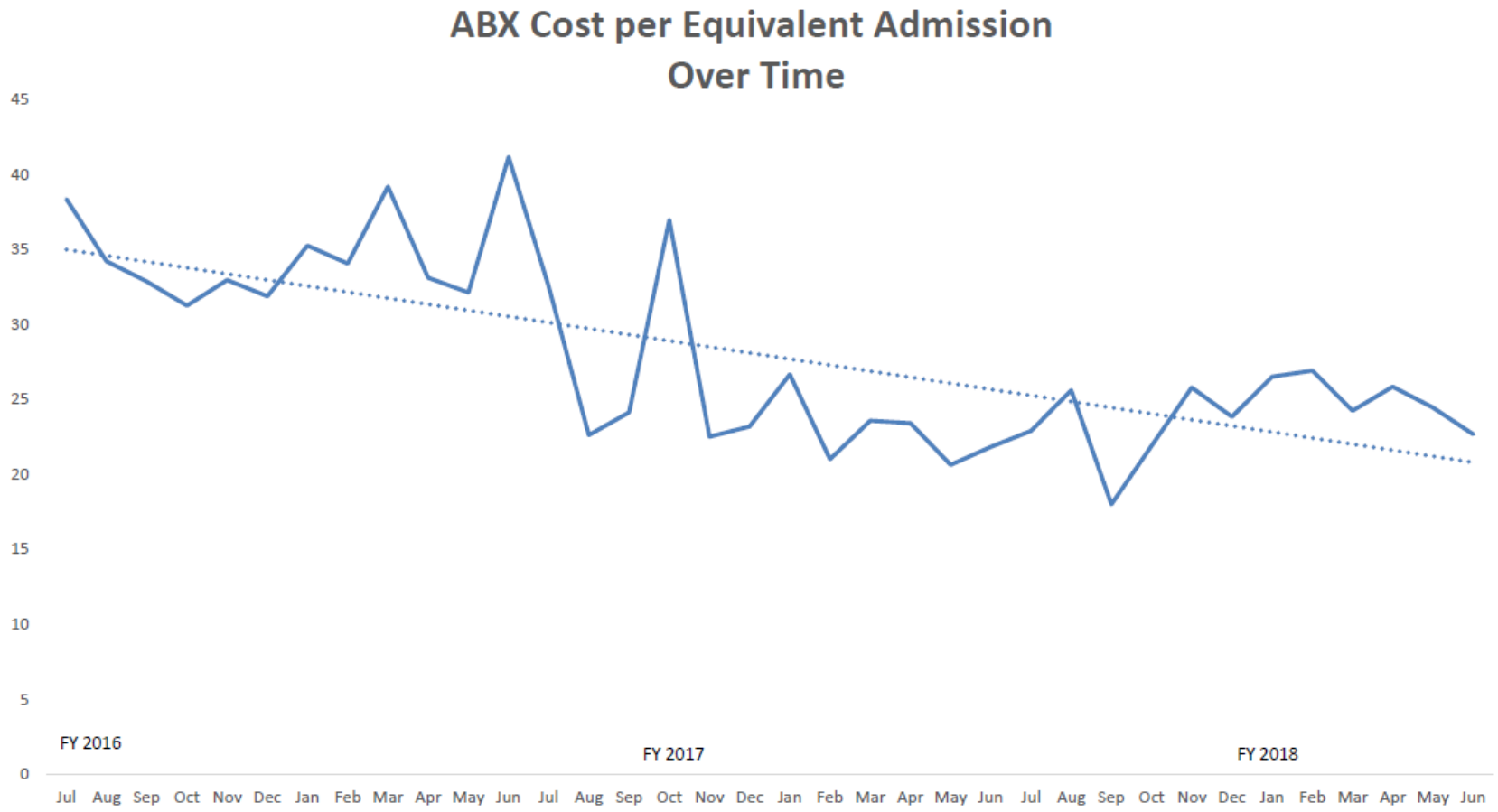
Cost / Admission



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Reporting

- Regular reports
  - ASP Committee
  - IP committee
  - Pharmacy & therapeutics committee
  - Quality & Patient Safety Committee
- Provider feedback on Abx prescribing
  - Monthly prescribing trends
  - Annual resistance report
- Report to nursing & others

7

Education

- Educate about resistance and optimal prescribing
  - Physicians and APPs
  - Pharmacists
  - Students, residents, and fellows
  - Nursing
  - Community
- Various strategies
  - Lectures and conferences
  - Posters and other visuals
  - Individualized feedback (“Academic detailing”)

The Joint Commission Antimicrobial Stewardship Standard

The Joint Commission

• Issued June 22, 2016 •

Prepublication Requirements

The Joint Commission has approved the following revisions for prepublication. While revised requirements are published in the semiannual updates to the print manuals (as well as in the online E-dition®), accredited organizations and paid subscribers can also view them in the monthly periodical *The Joint Commission Perspectives®*. To begin your subscription, call 877-223-6866 or visit http://www.jcrinc.com.

Joint Commission Requirement

New Antimicrobial Stewardship Standard

APPLICABLE TO HOSPITALS AND CRITICAL ACCESS HOSPITALS

Effective January 1, 2017

Medication Management (MM)

Standard MM.09.01.01
The [critical access] hospital has an antimicrobial stewardship program based on current scientific literature.

Elements of Performance for MM.09.01.01

1. Leaders establish antimicrobial stewardship as an organizational priority. (*See also* LD.01.03.01, EP 5)

   Note: *Examples of leadership commitment to an antimicrobial stewardship program are as follows:*

   - *Accountability documents*
   - *Budget plans*
   - *Infection prevention plans*
   - *Performance improvement plans*
   - *Strategic plans*
   - *Using the electronic health record to collect antimicrobial stewardship data*

   Note: *An example of an educational tool that can be used for patients and families includes the Centers for Disease Control and Prevention's Get Smart document, "Viruses or Bacteria—What's got you sick? at http://www.cdc.gov/getsmart/community/downloads/getsmart-chart.pdf.*

4. The [critical access] hospital has an antimicrobial stewardship multidisciplinary team that includes the following members, when available in the setting:

   - Infectious disease physician
   - Infection preventionist(s)
   - Pharmacist(s)
   - Practitioner

   Note 1: *Part-time or consultant staff are acceptable as members of the antimicrobial stewardship multidisciplinary team.*

   Note 2: *Telehealth staff are acceptable as members of the antimicrobial stewardship multidisciplinary team.*

5. Ⓓ The [critical access] hospital's antimicrobial stewardship program includes the following core elements:

   - Leadership commitment: Dedicating necessary human, financial, and information technology resources.

The Joint Commission

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Friday 3:31 CST, May 3, 2019

Antimicrobial Stewardship

Antimicrobial stewardship information

Antimicrobial stewardship can help prevent the development of multidrug resistant organisms, and reduce unnecessary drug use and costs associated with expensive, broad-spectrum therapies used to treat HAIs. Resources include a free toolkit that provides guidance to health care organizations building or looking to improve antimicrobial stewardship programs.

Google Search: Antimicrobial Stewardship standard

External Resources

- AHA: Antimicrobial Stewardship Toolkit
- AHRQ: Antibiotic Stewardship in Nursing Homes: How You Can Prevent Antibiotic Resistance (Video)
- CDC: Implementation of Antibiotic Stewardship Core Elements at Small and Critical Access Hospitals

Joint Commission Content

- Antimicrobial Stewardship - Pfizer IGLC Funded Project
- Speak Up: Antibiotics – Know the Facts
- Quick Safety: National Action Plan: Use antibiotics wisely
- Standards FAQS - MM.09.01.01

Joint Commission Resources

- Antimicrobial Stewardship Toolkit

https://www.jointcommission.org/topics/hai_antimicrobial_stewardship.aspx

Antibiograms 101

2017 Northern Michigan Antibiogram

Antibiotics (x-axis)

ANTIBIOGRAM DATA FROM 2017	# of isolates	Penicillin	Ampicillin	Unasyn/aug	Nafcillin/oxa	Pip/tazo	Cefazolin	Cefuroxime	Ceftriaxone	Ceftazidime	Cefepime	Ciprofloxacin	Levofloxacin	Moxifloxacin	Gentamicin	TMP/SMX	Meropenem	Azithromycin	Doxycycline	Clindamycin	Vancomycin (IV only)	Nitrofurantoin (urine only)
S. pneumoniae	278	66	+	+	+	+	+	+/-	88	+/-	+	NR	99	+	-	84	+	+	77		100	-
S. aureus, MSSA	2,777	0	-	100	100	100	100	+	+	+/-	100	NR	NR	NR	-	99	+	+/-	98		100	99
S. aureas, MRSA	948	-	-	-	-	-	-	-	-	-	-	NR	NR	NR	-	97	-	-	95		100	99
Staphylococcus epidermidis	558	0	+/-	47	47	+/-	47	+/-	+/-	-	+/-	NR	NR	NR	+/-	57	+/-	+/-	91		100	98
Streptococcus, Group B																				48	100	-
Streptococcus intermedius	140																				100	-
Enterococcus faecalis	1,183																				98	99
Enterococcus faecium	81																				74	17
Haemophilus influenzae	316																				-	-
Escherichia coli	12,439																				-	97
Proteus mirabilis	1,119																				-	28
Klebsiella oxytoca	456																				-	89
Klebsiella pneumoniae	2,164																				-	45
Enterobacter cloacae	575																				-	51
Enterobacter aerogenes	265																				-	15
Serratia marcescens	240	-	-	-	-	100	-	-	99	99	99	96	96	+	98	98	100	-	-	-	-	23
Pseudomonas aeruginosa	1,357	-	-	-	-	93	-	-	-	93	95	86	82	+	91	-	95	-	-	-	-	-

48% of 741 Group B *Strep* isolates tested against Clindamycin are "sensitive" according to CLSI breakpoints

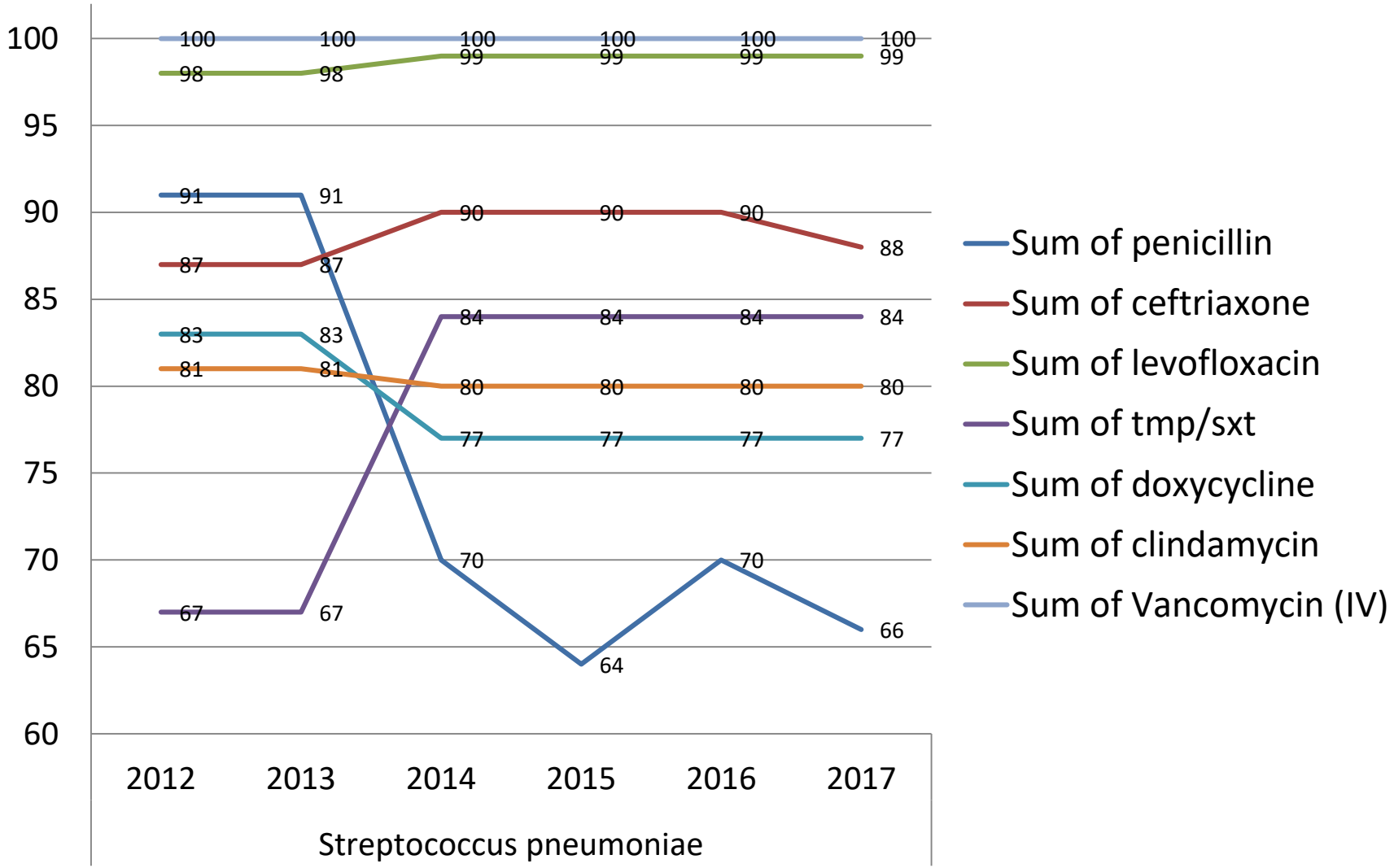
52% are intermediate or resistant

Bacteria (y-axis)

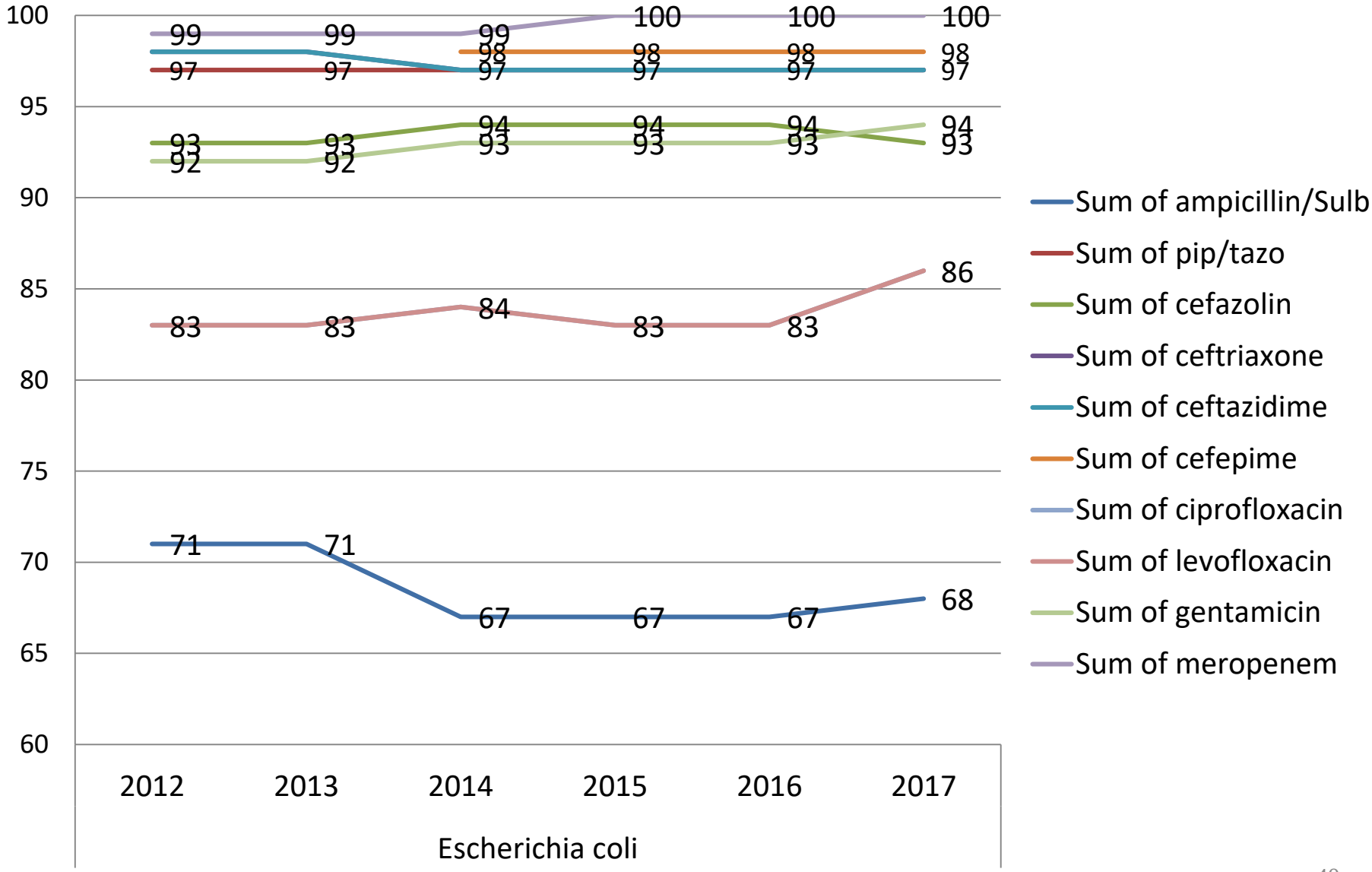
Utility of Antibiograms

- Guides empiric antimicrobial-use guidelines
- Provides the ability to monitor and trend antibiotic resistance over time
- Allows institutions to compare resistance rates between hospital wards (i.e. Intensive care unit vs. General Floor)
- Can be used as a surrogate marker for the effectiveness of antimicrobial stewardship programs

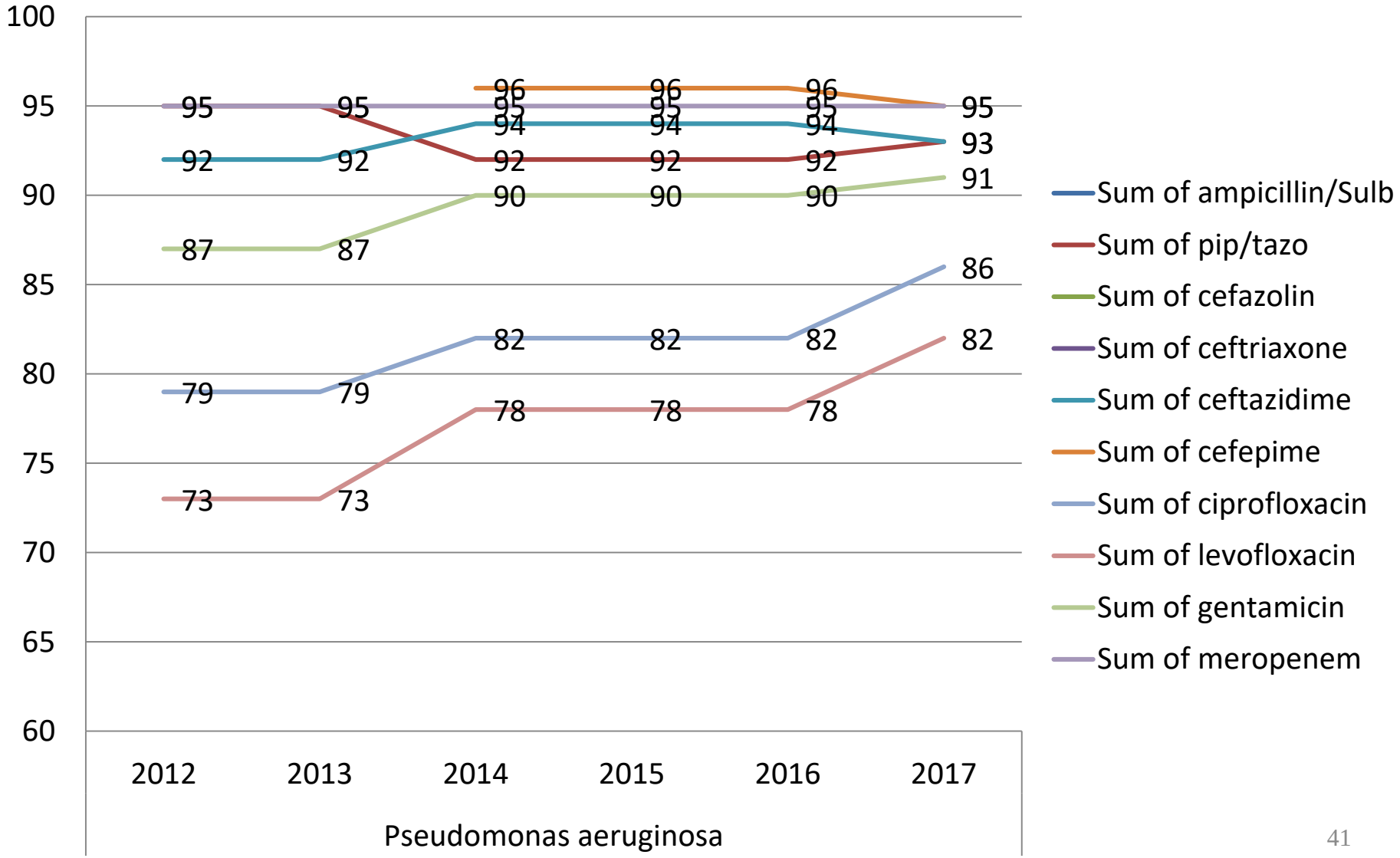
Streptococcus Pneumoniae Susceptibilities 2012 - 2017



E. coli Suscpetibilities 2012 - 2017



Pseudomonas aeruginosa Suscpetibilities 2012 - 2017



Limitations of Antibiograms

- Only used for empiric antibiotic selection (not used when culture and sensitivity data are known)
- Information is limited to a geographical area (i.e. state, city, hospital, medical unit) and number of isolates collected.
- Cannot correlate clinical outcomes with percent susceptibility.
  - **For example**: 90% of Methicillin sensitive *Staph aureus* is susceptible to levofloxacin (in northern MI), but this would not be used in practice because resistance can develop after a couple days into therapy.

Interpretation of Culture and Sensitivity reports

	Escherichia coli	
Drug	Interp-MIC	MIC ug/mL
ampicillin	Suscept	8
ampicillin-sulbactam	Suscept	4
cefazolin	Suscept	<=4
ceftazidime	Suscept	<=1
ceftriaxone	Suscept	<=1
ciprofloxacin	Suscept	<=0.25
gentamicin	Suscept	<=1
levofloxacin	Suscept	<=0.12
meropenem	Suscept	<=0.25
piperacillin-tazobactam	Suscept	<=4
sulfamethoxazole-trimethoprim	Suscept	<=20
tobramycin	Suscept	<=1

Patient Case #1

- 25 year old female presents with dysuria, urinary frequency, and urgency for the last 3 days.
- No fever, chills, or flank pain.
- She has no other significant past medical history.

- **Diagnosis**: uncomplicated cystitis (UTI)

Patient Case #1

- Urine was cultured
  - ***E. coli*** **>100,000 colony forming units**

	% *E. coli* susceptibility
Amoxicillin	61%
Cephalexin	93%
Ciprofloxacin	86%
Levofloxacin	86%
Trimethoprim/ sulfamethoxazole	82%
Nitrofurantoin	97%
Fosfomycin	99%

Help!

	Pseudomonas aeruginosa		
Drug	Interp-KB	Interp-MIC	MIC ug/mL
ampicillin		Resistant	>=32
ampicillin-sulbactam		Resistant	>=32
cefazolin		Resistant	>=64
ceftazidime		Intermed	16
ceftriaxone		Resistant	>=64
ciprofloxacin		Resistant	>=4
colistimethate			
gentamicin		Resistant	>=16
levofloxacin		Resistant	>=8
meropenem		Resistant	>=16
nitrofurantoin		Resistant	>=512
piperacillin-tazobactam		Intermed	32
sulfamethoxazole-trimethoprim		Resistant	>=320
tobramycin		Resistant	>=16
Ceftolozane/tazobactam		Suscept	≤ 1

Sputum culture

Multidrug Resistant (MDR) *Psuedomonas aeruginosa*

Stewardship General Principle

- Just because a bacteria is present in a culture result, does not mean that antibiotics will improve the patient's outcome.
- Prior to recommended antibiotics, we must ask if the benefit of antibiotic use will outweigh their risks

How do you respond to “What drug do I use to treat _____?”

1. Is an infection present?
2. If indicated, are appropriate cultures obtained?
3. Do antimicrobials have data to support improved patient outcomes?
4. Is the benefit of antimicrobial use >>> risk?

5. “5 Right’s” of Antimicrobial pharmacotherapy
   - Indication
   - Drug
   - Dose
   - Frequency
   - Duration

AMS Presentation
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Nicholas Torney, Pharm.D.

ntorney@mhc.net

231-935-7469